REMARKS/ARGUMENTS

Upon entry of the foregoing amendments, claims 1, 3-16, and 18-21, will remain pending in the present application, claims 2 and 17 having been canceled herein in view of their limitations having been incorporated into their respective independent base claims 1 and 16. New dependent claims 22-35 have been added to the application. Claims 1, 9, and 16 are the independent claims.

Support for Priority Claims

The May 17, 2007 Office Action affirmed the applicants' claim to priority benefits from U.S. Patent Application Serial No. 09/835,905 filed April 16, 2001 (now abandoned), of which the present application is a continuation. However, the Office Action denied the applicants' claim to priority benefits from U.S. Patent Application Serial No. 09/585,696 filed June 1, 2000 (now U.S. Patent No. 6,517,962), which in turn claimed priority benefits from U.S. Provisional Patent Application Serial No. 60/150,253 filed August 23, 1999. The parent '905 application was a continuation-in-part of the '696 application. The parent '905 application also claimed priority benefits from PCT/International Application No. PCT/GB01/00458 filed February 6, 2001, as set forth in the Cross-Reference to Related Applications section of the present application.

The May 17, 2007 Office Action apparently limited the applicants' priority claim to the '905 application because of a finding that the disclosure(s) of the '696 application and its underlying provisional '253 application did not provide adequate support for the subject matter disclosed and being claimed in the present application. The applicants' claim to priority benefits from the PCT/International application was not mentioned in the May 17, 2007 Office Action.

Applicants submit that the present application is fully entitled to priority benefits from each of the '696 application filed on June 1, 2000, its underlying provisional '253 application filed on August 23, 1999, and the PCT/International application filed on February 6, 2001. The '696 application contains a disclosure of, and full support for, subject matter now being claimed in the present application. In particular, the '696 application discloses a fuel cell anode structure that includes (a) a substrate, (b) a first carbon-based component comprising a first carbon material, and (c) a second carbon component that is substantially more resistant to corrosion than the first carbon-based component and in which the first carbon-based component has substantially no resistance to corrosion. For example, at column 9, lines 13-23 of its resulting patent, No. 6,517,962, the '696 application states:

> There may be ***additional advantages associated with the use of certain carbon or other additives in the anode.*** First, if the additive is adjacent to a carbon substrate or to carbon particles used to support the catalyst, the additive may serve to protect the carbon substrate or supports against oxidation merely by blocking ionic access to the carbon surface. Secondly, ***certain carbon or other additives may oxidize more easily than the carbon substrate or supports and thus may serve as sacrificial electrode material (that is, the sacrificial additive oxidizes instead of the carbon substrate or support).***

(Emphasis added.) A definitive connection between oxidation and corrosion is also described in the '696 application at, for example, column 3, lines 36-41 of the '962 patent:

> When water electrolysis reactions at the anode cannot keep up with the current forced through the cell, the absolute potential of the anode can rise to a point where ***oxidation (corrosion) of***

> ***anode components takes place, thereby typically irreversibly degrading the components.***

(Emphasis added.)

Persons skilled in the technology involved here would thus readily discern, from the portions of the '696 application cited above, that a first carbon-based component (the "sacrificial additive") disposed in a fuel cell anode should have little or no corrosion resistance, such that the sacrificial additive is corroded in preference to the second carbon component. Applicants therefore submit that subject matter disclosed and being claimed in the present application is fully supported in the disclosure of the '696 application, and that the present application is at least entitled to the benefit of its June 1, 2000 filing date.

Moreover, applications are entitled to the benefit of their provisional application filing date of August 23, 1999. In this regard, the provisional application states, on pages 19-20:

> There may be additional advantages associated with the use of certain carbon or other additives in the anode. First, if the additive is adjacent to a carbon substrate or to carbon particles used to support the catalyst, the additive may serve to protect the carbon substrate or supports against oxidation merely by blocking ionic access to the carbon surface. Second, ***certain carbon or other additives may oxidize more easily than the carbon substrate or supports and this may serve as sacrificial electrode materials (that is, the sacrificial additive oxidizes instead of the carbon substrate or support).***

As to the applicants' claim to priority benefits from PCT/International Application No. PCT/GB01/00458, applicants submit that the parent '905 application is entitled to the benefit of the February 6, 2001 international filing

date. In this regard, the PCT application discloses that a first carbon-based component disposed in a fuel cell anode should have little or no corrosion resistance, such that during cell reversal, the first carbon-based component will be corroded in preference to other carbon material present in the anode structure. As set forth on page 7 of the PCT publication:

> The first carbon-based component may consist entirely of a first carbon material or may comprise ***a first carbon material and one or more other materials which may for example be present to promote the corrosion rate of the first carbon material*** or to act as a binder. The one or more other materials which may be present in the first carbon- based component include polymeric materials, for example a proton conducting polymer electrolyte, such as Nafion, or a non-proton conducting polymer, for example PTFE. ***The first carbon-based component present in the anode structure*** (whether solely of first carbon material or of first carbon material plus other material (s)) ***shows little or no resistance to corrosion, and therefore when used in an electrochemical cell that has entered a period of cell reversal, the first carbon-based component will be corroded in preference to any other carbon also present in the anode structure, for example a carbon support for the electrocatalyst***. In other words, ***the first carbon-based component is acting as a sacrificial carbon component. This will protect any further carbon present in the anode from corrosion and thus maintain its desired function when the cell returns to normal operation***. For instance ***this will prevent the carbon black in the electrocatalyst carbon support and the carbon in the gas diffusion layer from corroding***. Consequently the anode electrocatalyst and the anode gas diffusion layer will be protected from the effects of cell reversal, allowing the cell to function without having suffered significant irreversible

performance decay when the cell reverts to normal fuel cell operation after the cell reversal incident.

As with the '696 application, persons skilled in the technology involved here would thus readily discern, from the portions of the PCT application cited above, that a first carbon-based component (the "sacrificial additive") disposed in a fuel cell anode should have little or no corrosion resistance, such that the sacrificial additive is corroded in preference to the second carbon component. Applicants therefore submit that subject matter disclosed and being claimed in the present application is fully supported in the disclosure of the PCT application, and that the present application is entitled to the benefit of the February 6, 2001 international filing date.

Anticipation Rejection of Claims 1, 3-16, and 18-21 in view of Cabasso et al.

In the May 17, 2007 Office Action, claims 1-21 were rejected as being anticipated under 35 U.S.C. § 102(b) by Cabasso et al.U.S. Patent No. 5,783,325 to ("*Cabasso*"). Applicants submit that Cabasso cannot anticipate any of amended independent claims 1, 9, and 16, as amended herein, because Cabasso nowhere teaches or suggests a fuel cell anode structure that includes (a) a substrate, (b) a first carbon-based component comprising a first carbon material, and (c) a second carbon component that is substantially more resistant to corrosion than the first carbon-based component and in which the first carbon-based component has substantially no resistance to corrosion

Cabasso discloses a conventional electrode structure that includes a gas diffusion layer (GDL) with a carbon fill and a carbon-supported electrocatalyst applied to the GDL ***as a separate layer***. In Cabasso's structure, one of the carbon

components is associated with the electrode and the other carbon component is associated with the GDL. In this regard, Cabasso states:

> In one aspect, this invention concerns an electrolyte gas diffusion electrode for fuel cells comprised of:
>
> an anisotropic ***gas diffusion layer that is made of a porous carbon matrix through which carbon particles*** and poly (vinylidene fluoride are distributed . . ., and
>
> ***a catalytic layer that is made of a coagulated "ink" suspension containing catalytic carbon particles*** and a thermoplastic polymer, the catalytic layer covering the small pore surface of the gas diffusion layer . . . .

(Cabasso at column 4, lines 38-52; emphasis added.)

Cabasso's structure is thus limited to a GDL having only one carbon component associated therewith and a separate catalytic layer containing carbon particles covering the surface of the GDL. Cabasso nowhere discloses or suggests a GDL that includes a first carbon-based component and a second carbon component that is more resistant to corrosion than the first carbon-based component and in which the first carbon-based component has substantially no resistance to corrosion. Cabasso cannot, therefore, anticipate any of claims 1, 9 and 16 or their dependent claims 3-15 and 18-35.

Moreover, Cabasso's electrode structure is explicitly designed for a ***cathode***, not an anode as in the applicants' claimed electrode structure having voltage reversal tolerance. In this regard, Cabasso at column 10, lines 42-44 states: "it was clearly observed that by using air as the catholic reactant, this electrode has better performance than any other electrode." See also Cabasso's

Figure 5. In fact, it is deterioration of the ***anode*** that the applicants' claimed structure is directed toward alleviating. Absent any disclosure or suggestions that Cabasso's cathode structure should, or even could, be employed in the anode so as to improved voltage reversal tolerance, Cabasso cannot anticipate any of claims 1, 9 and 16 or their dependent claims 3-15 and 18-35.

* * * * *

In view of the foregoing amendments and remarks, applicants submit that claims 1, 3-16, and 18-21 are allowable, in addition to newly-added dependent claims 22-35. The Examiner is invited to telephone the applicants' undersigned attorney at (312) 775-8000 if any unresolved matters remain concerning the present Office Action.

Please charge any fees incurred in connection with this submission to Deposit Account No. 13-0017.

Respectfully submitted,

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